

*Further Observations on Welwitschia.**

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(Abstract.)

The material which forms the subject of this investigation was collected at Welwitsch and Haikamchab, in Damaraland, in January and February, 1907.

Macrospores and embryo-sacs are frequently present in the pith region of the female cone-axis. This confirms the view, already adopted by most authors, that the ovule of *Welwitschia* is cauline. Sporogenous cells have not been found in a similar position in the male cone.

It is suggested that the female cone and the male flower are derived by reduction and specialisation from an amphisporangiate strobilus of a type similar to that of *Bennettites*.

At the end of the free nuclear division the embryo-sac contains about 1024 nuclei which are equivalent in all visible characters. Cleavage of the cytoplasm occurs, resulting in the septation of the whole sac into compartments. Those near the micropylar end contain few nuclei which are functionally sexual; most of those of the lower three-fourths enclose many potentially sexual nuclei. The former send out embryo-sac-tubes into the nucellar cone and into them pass the cytoplasm and free nuclei; all the nuclei in each of the latter fuse so that each compartment becomes a uninucleate cell. The compartments containing the fusion-nuclei form the primary endosperm, whose later growth is distributed over two periods, one before and the second after fertilisation. The endosperm of *Gnetum* is probably formed in the same way. In respect of the morphological character of the endosperm, *Gnetum* and *Welwitschia* are widely separated from *Ephedra*, in which the endosperm is a prothallus of the normal gymnosperm type. It is suggested that the endosperm of the primitive angiosperms was homologous with that of *Welwitschia*.

The embryo-sac-tubes meet the pollen-tubes in the lower half of the nucellar cone. Fertilisation occurs within the generative cell.

The generative cell enlarges after leaving the pollen-grain and its nucleus divides. The daughter nuclei are functional gametes.

Several oospores are commonly formed in each nucellus. The cytoplasm of

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the oospore is mainly, if not entirely, provided by the generative cell. A resting nucleus is formed.

The oospore elongates towards the top of the endosperm. The first nuclear division within it is followed by the formation of a centripetally developed wall which separates the upper "primary suspensor" from a lower terminal cell. From the latter are developed: (a) 24 cells which, surrounding the lower part of the primary suspensor, form with it the "secondary suspensor"; (b) a terminal group enclosing a presumed embryonic plate of eight cells. The later stages of embryo-development have not been seen; they possibly occur, as in *Gnetum*, after the seed is detached from the plant.

It is suggested that (1) The *Gnetum*-*Welwitschia* alliance has its origin in the same stock as the angiosperms, but separated from the angiosperm line before the carpel became the pollen-receiver; (2) *Welwitschia* is the most specialised living representative of the race to which it belongs.

*On the Presence of Hæm-agglutinins, Hæm-opsonins, and Hæm-
lysins in the Blood obtained from Infectious and Non-
Infectious Diseases in Man. (Preliminary Report.)*

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(From the Pathological Laboratories, St. Thomas's Hospital.)

This preliminary report is for the purpose of introducing certain results which have been obtained by allowing normal and immune human serum to act in the presence of normal and immune blood cells.*

These experiments have brought to light many interesting and important points in human hæmatology. The unlimited number of experiments which have been made on immune substances in the blood of the lower animals in comparison to similar investigations in man is most striking. It is necessary to draw special attention to the fact that the work of others has been either briefly referred to or omitted merely because this report is only intended to draw attention to the main facts met with in these investigations, avoiding as far as possible a detailed survey of the subject.

* The expression "immune cell" and "immune serum" is used to designate the blood-cells and sera taken from cases of any general disease or condition. The term "immunity," *i.e.*, is not confined, in this communication, to the series of phenomena resulting from bacterial infection alone.